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Impact of fruit flies (Diptera:Tephritidae) on Chayote (#*Sechium edule*;) in Reunion Island

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Background. Chayote is a popular vegetable in Reunion Island. Traditionally and extensively cultivated for its leaves, it is nowadays usually intensively cultivated under trellises for the production of fruit. A high number of fruit fallen on the ground result in a significant loss in production. Farmers attribute this to three fruit fly species (*Bactrocera cucurbitae*, *Dacus ciliatus* and *Dacus demmerezi*) which roost in the trellises. This situation provokes major insecticide applications in the chayote trellises to combat fruit flies. The present study aimed therefore at evaluating the real incidence of fruit flies in chayote cultivation.

Methods. The experiments were conducted in 2008 and 2009 and observations in trellised crops were performed in different sites on the island. In 2008, hundreds of fruit were collected at a single site to study the susceptible stage of the chayote fruit while the development of samples of 20 recently blemished fruit and 20 unblemished fruit was regularly followed in the field. In addition, 120 blemished fruit were collected in 2008 in two sites 20 fruit were weekly collected at a site in 2009 and the emergence of adult flies was measured in the Cirad laboratory over 15 days. In addition, bird nets were placed under the trellis of three fields in 2009 to collect fallen fruit and the number of blemishes and the infestation of the fruit gathered were examined. In the lab, eight chayote fruit were exposed to gravid females per fly species and dissected.

Results. In situ, fruit smaller than 6 cm length appeared to be unaffected by female blemishes. Two to four weeks after blemishes under the trellis, the blemished fruit did not show any morphological difference compared to unblemished fruit. This observation was strengthened by the results of emergence tests: only one of 120 blemished fruit collected in 2008 and only five fruit collected from 219 fruit harvested in the crop in 2009 showed emergence of flies. *D. ciliatus* appeared to be the only species able to emerge not only from these infested fruit collected in the field but also from the fruit exposed to gravid females in the lab. A defence reaction of the fruit to eggs or L1 larvae of *B. cucurbitae* and *D. demmerezi* was also observed by dissecting infested fruit in the lab. Finally, other field observations showed that only 13 of 197 fruit fallen from the trellis were infested by larvae, meaning that 93 % of fruit fell for other reasons.

Conclusion. This study provides first results on the real incidence of fruit flies in chayote crops in Reunion Island. Although fly adults roost in chayote trellis, these pests are not responsible for the significant production losses recorded by the farmers. This suggests that the chemical protection used against fruit flies in chayote trellis is not appropriate, especially when one considers the secondary negative effects of the chemical treatments. A physiological shedding caused by an overloaded production of fruit under this type of intensive cultivation under trellis could be the main cause of the fruit fall and this requires further research.

Key words: fruit flies, chayote, *Sechium edule*, Reunion Island